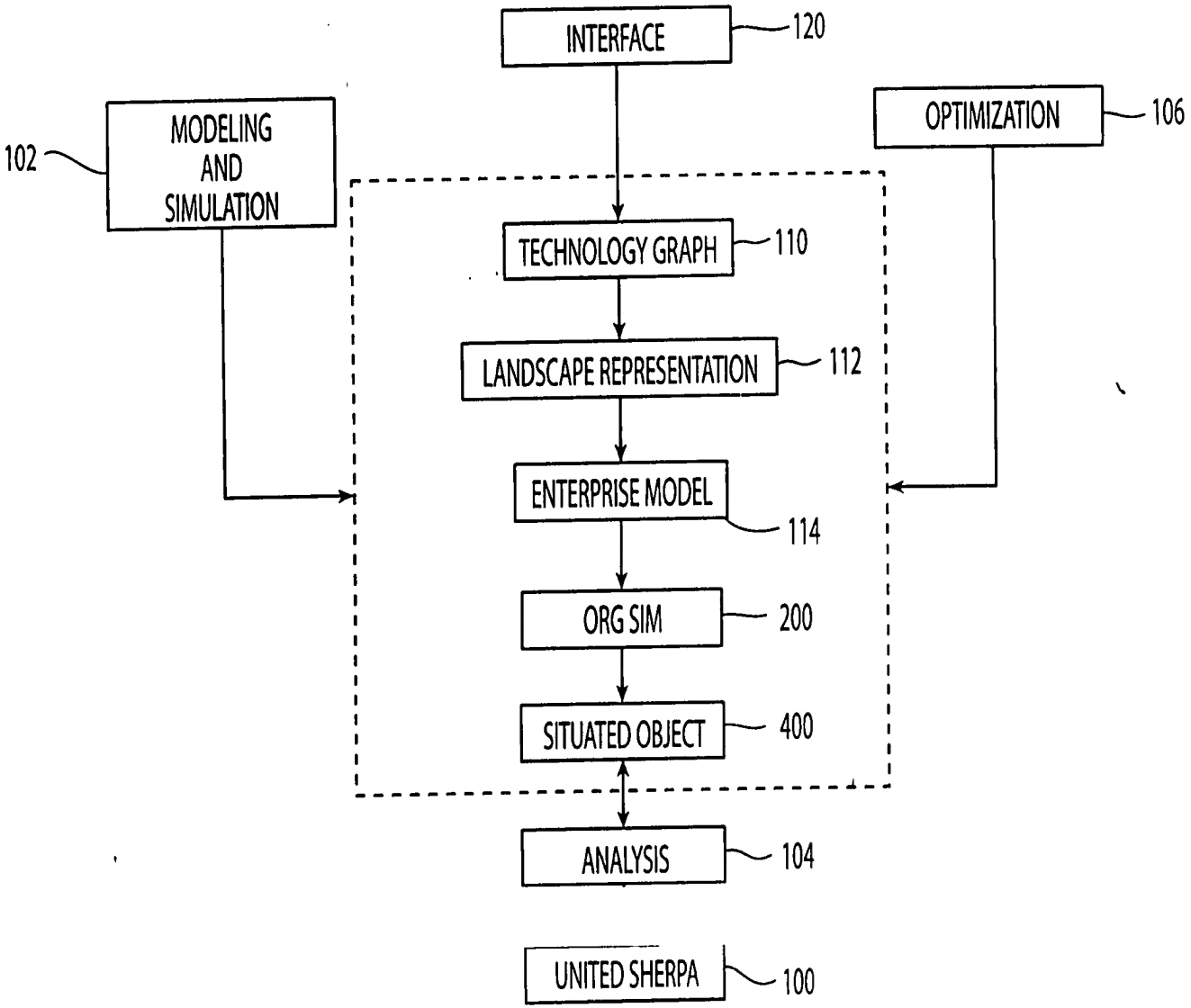


Fig. 1

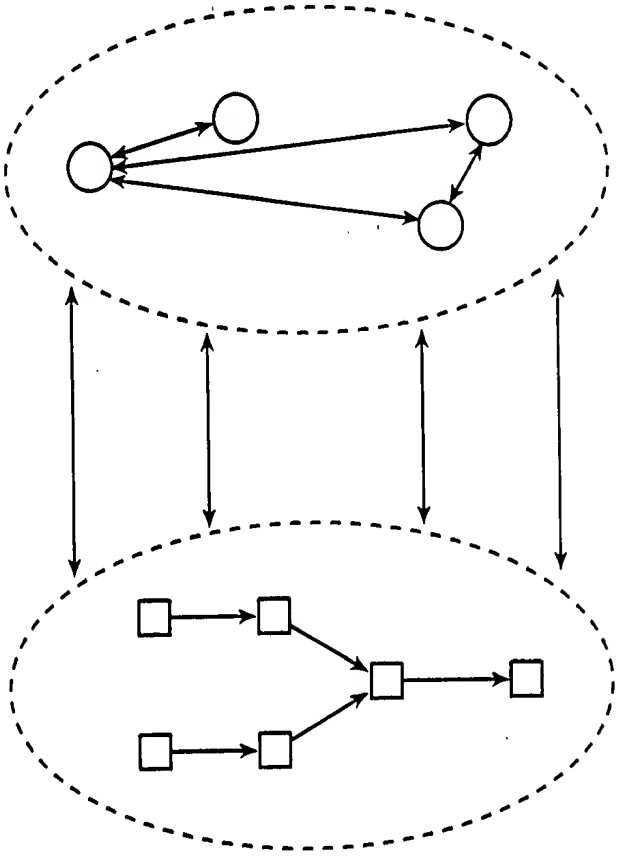


Fig. 2

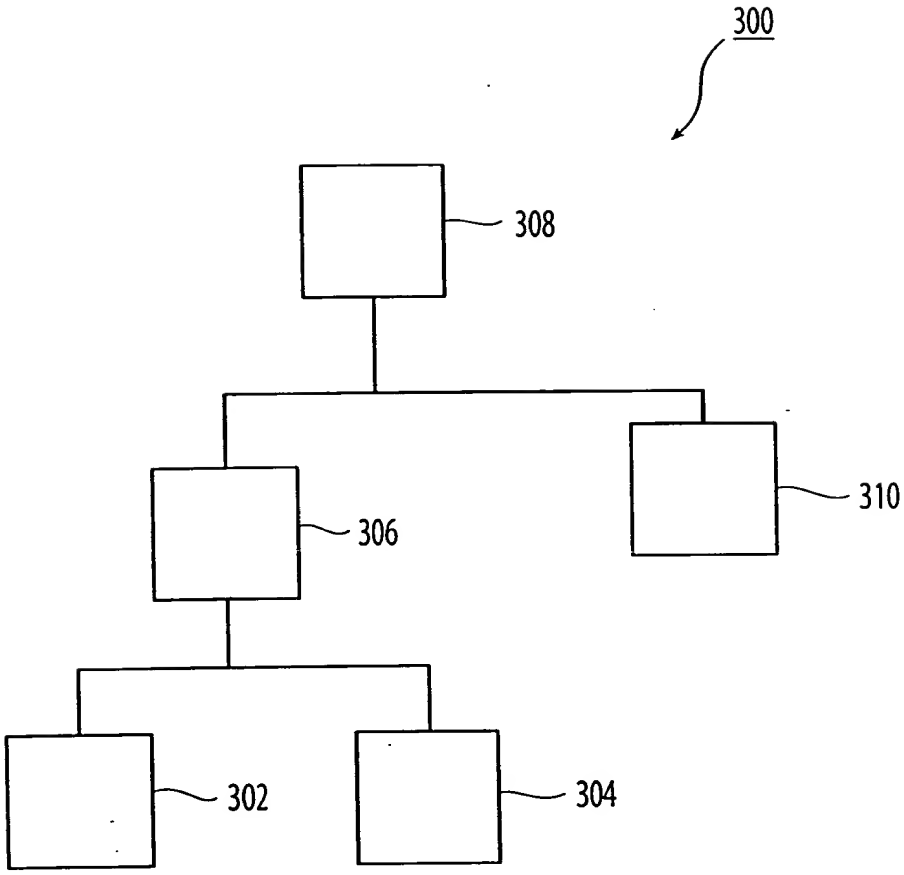


Fig. 3

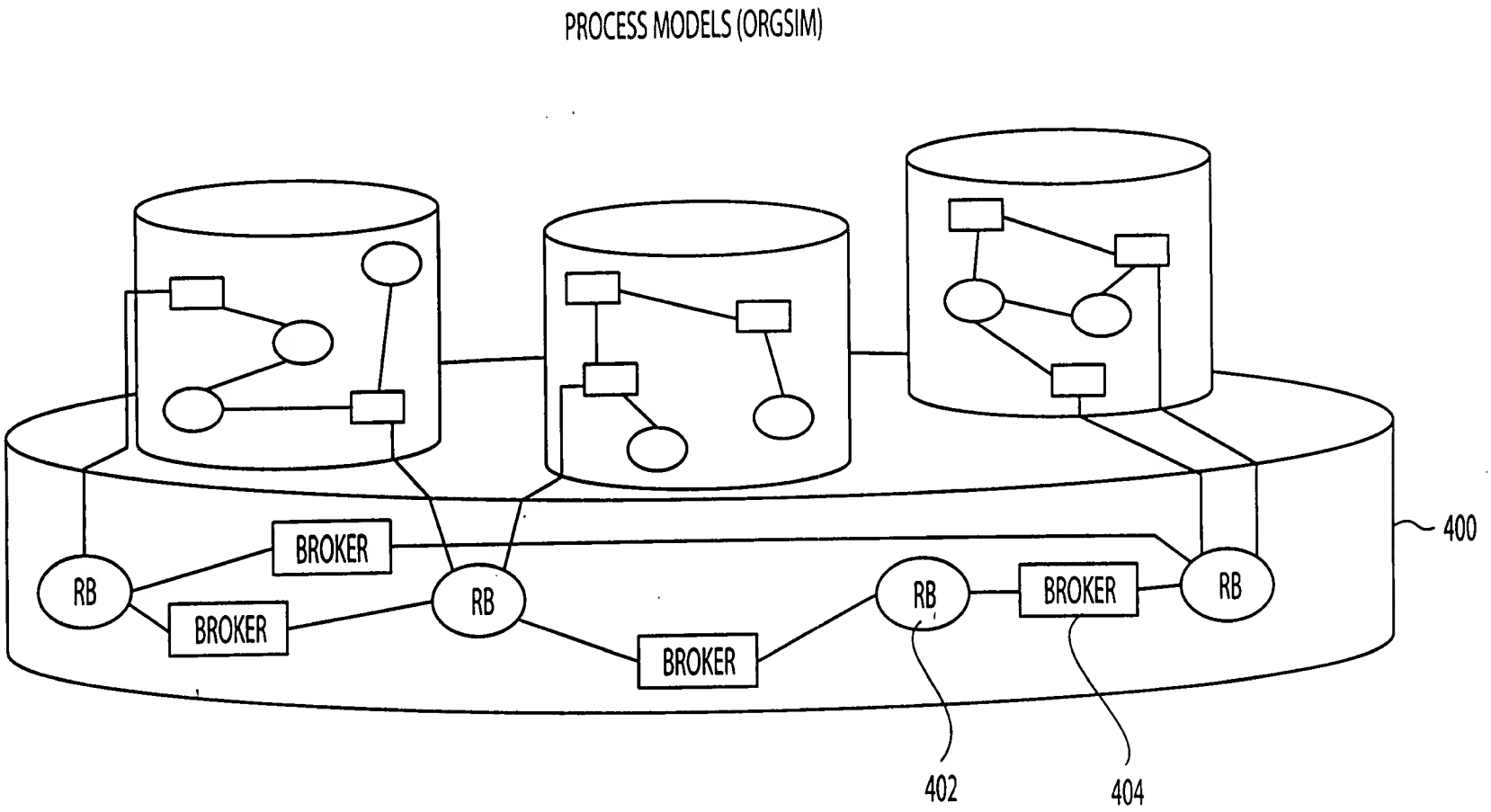

PROCESS MODELS (ORGSIM)
BROKER
RB
BROKER
RB
BROKER
RB
BROKER
RB
400
402
404

Fig. 4a

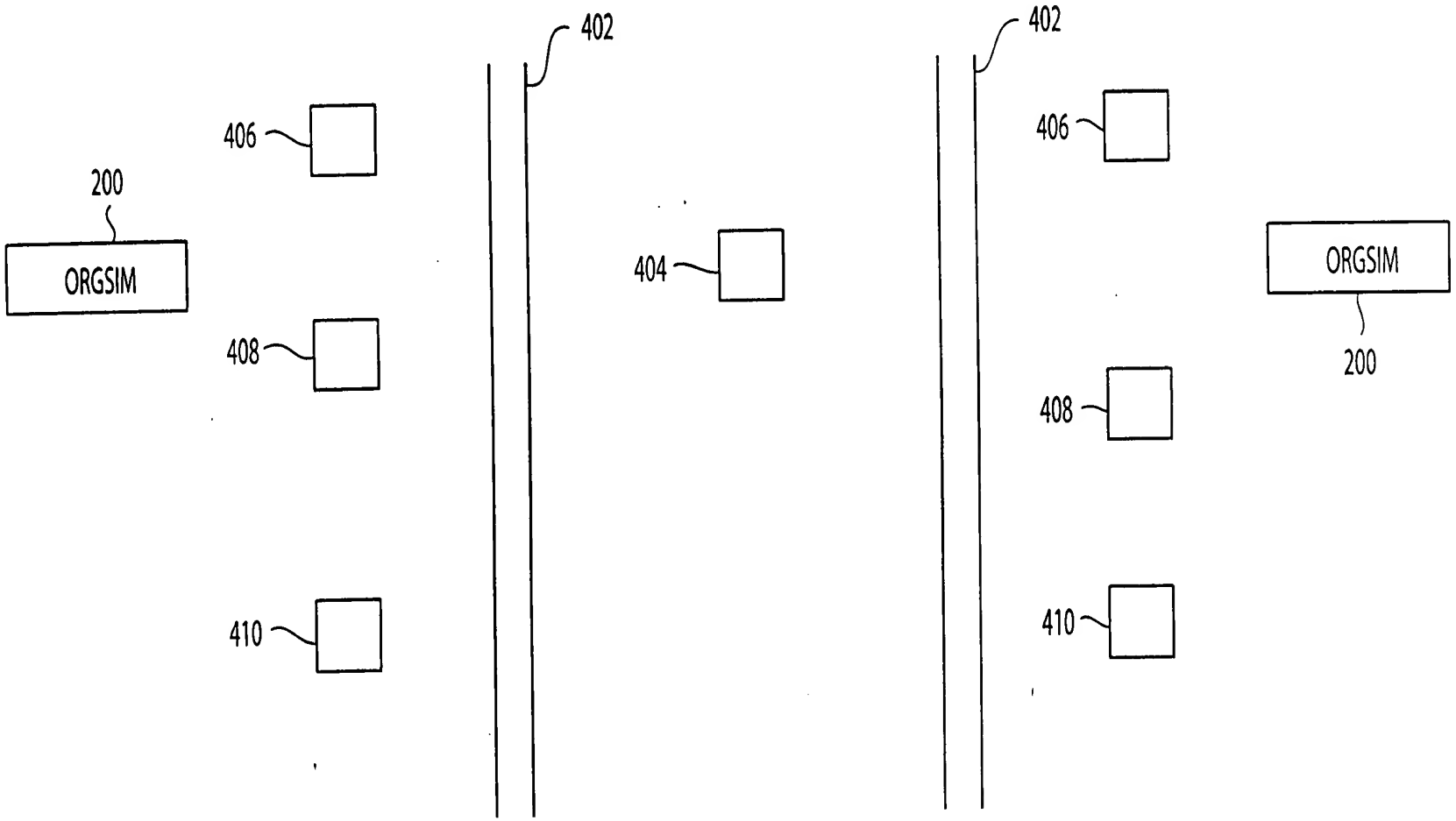


Fig. 4b

RESOURCE BUS (6): PROPAGATION

- C1 REQUESTS {B C D} 450
- P1 OFFERS {A B C D E} 452
- C1 ACCEPTS {A B C D E} 454
- (IF E NOT REQUESTED, EVENTUALLY LOST) 456
- C1 AS P2 OFFERS {A B C D} 458
- C2 REQUESTS {A B C....} ETC... 460

Fig. 4c

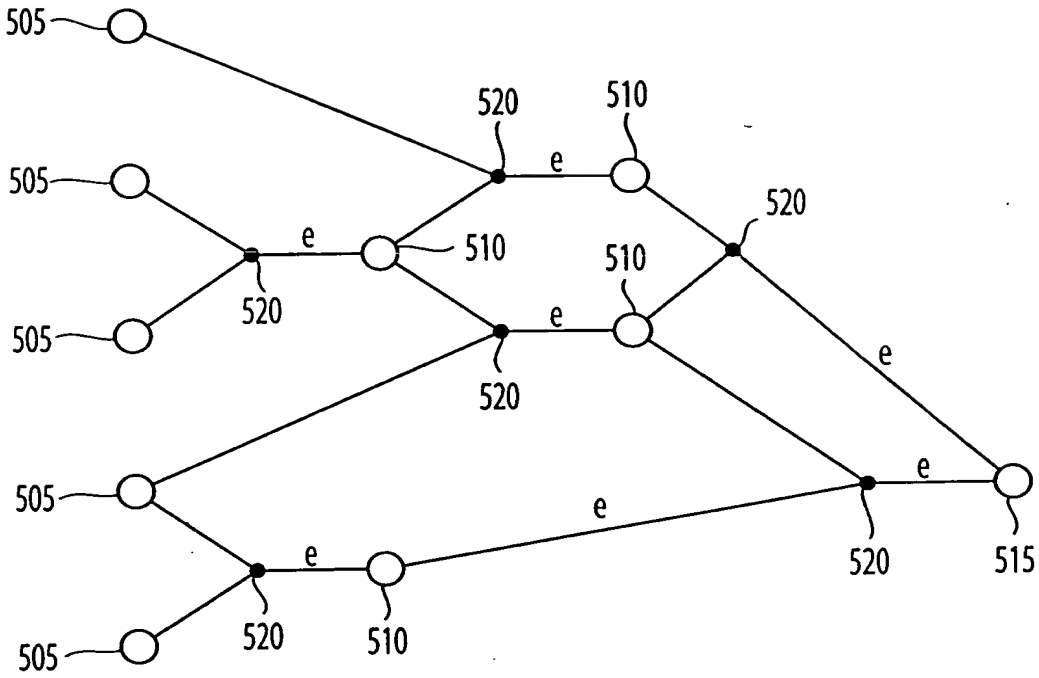


Fig. 5

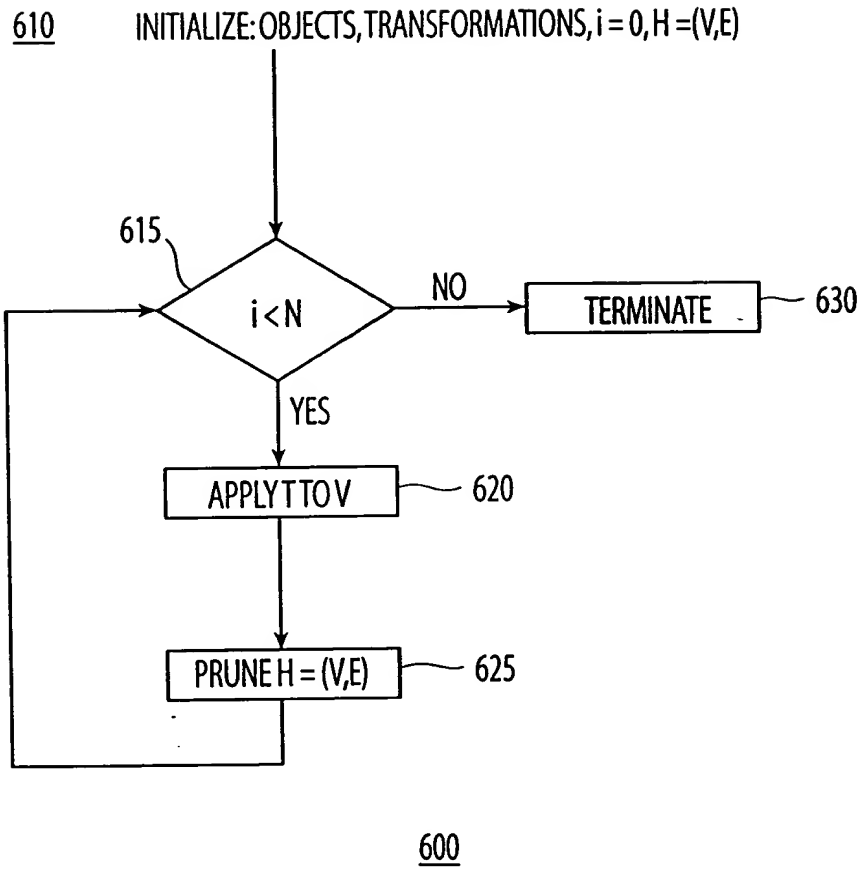

610
INITIALIZE: OBJECTS, TRANSFORMATIONS, i = 0, H =(V,E)
615
i<N
NO
TERMINATE
630
YES
APPLY T TO V
620
PRUNE H = (V,E)
625
600

Fig. 6

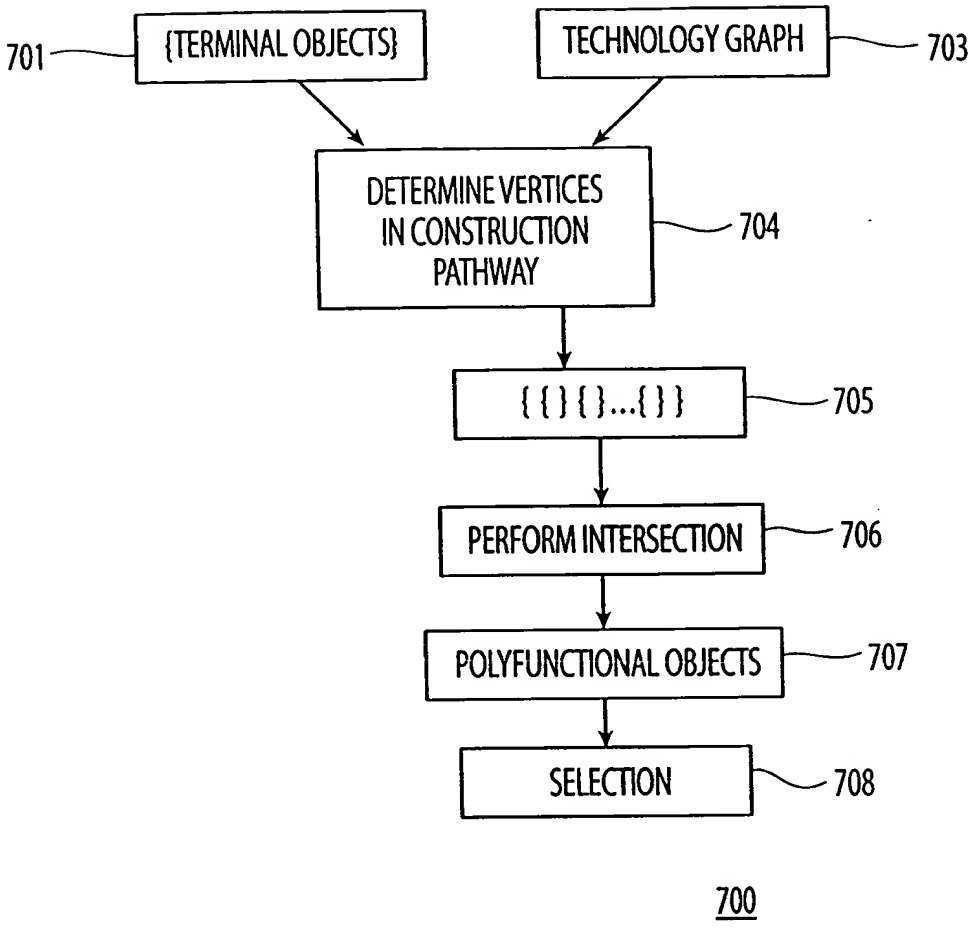

701
{TERMINAL OBJECTS}
TECHNOLOGY GRAPH
703
DETERMINE VERTICES IN CONSTRUCTION PATHWAY
704
{ { } { } ... { } }
705
PERFORM INTERSECTION
706
POLYFUNCTIONAL OBJECTS
707
SELECTION
708
700

Fig. 7

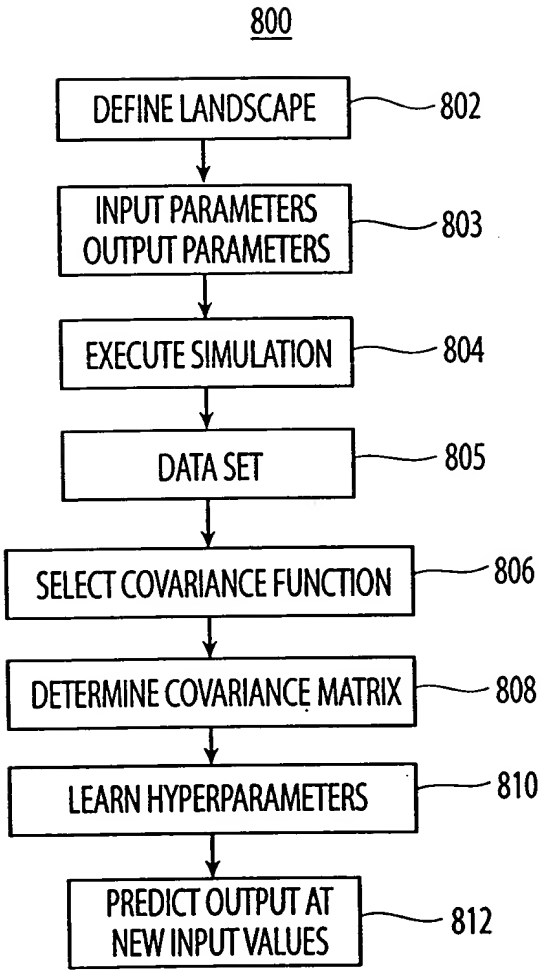

800
DEFINE LANDSCAPE
802
INPUT PARAMETERS
OUTPUT PARAMETERS
803
EXECUTE SIMULATION
804
DATA SET
805
SELECT COVARIANCE FUNCTION
806
DETERMINE COVARIANCE MATRIX
808
LEARN HYPERPARAMETERS
810
PREDICT OUTPUT AT
NEW INPUT VALUES
812

Fig. 8

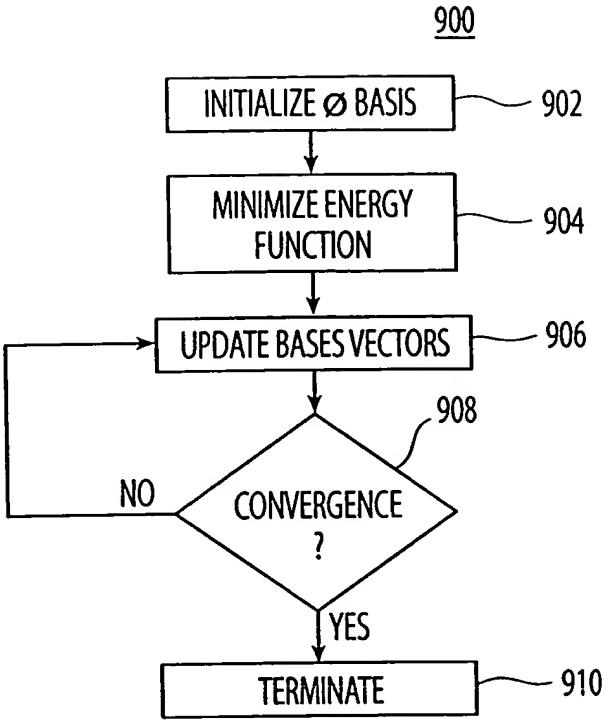


Fig. 9

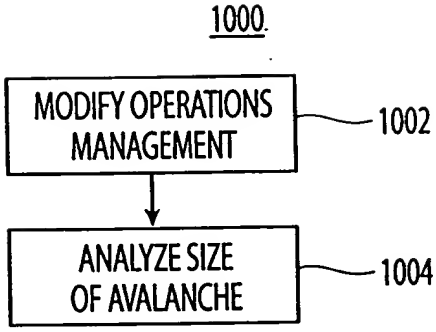


Fig. 10

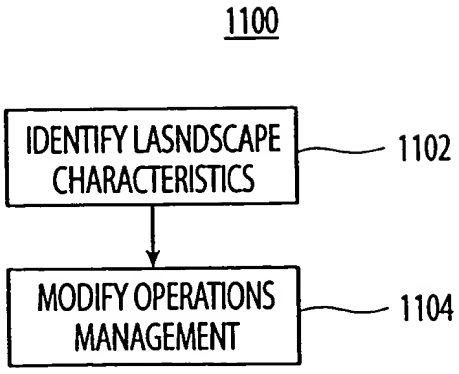


Fig. 11

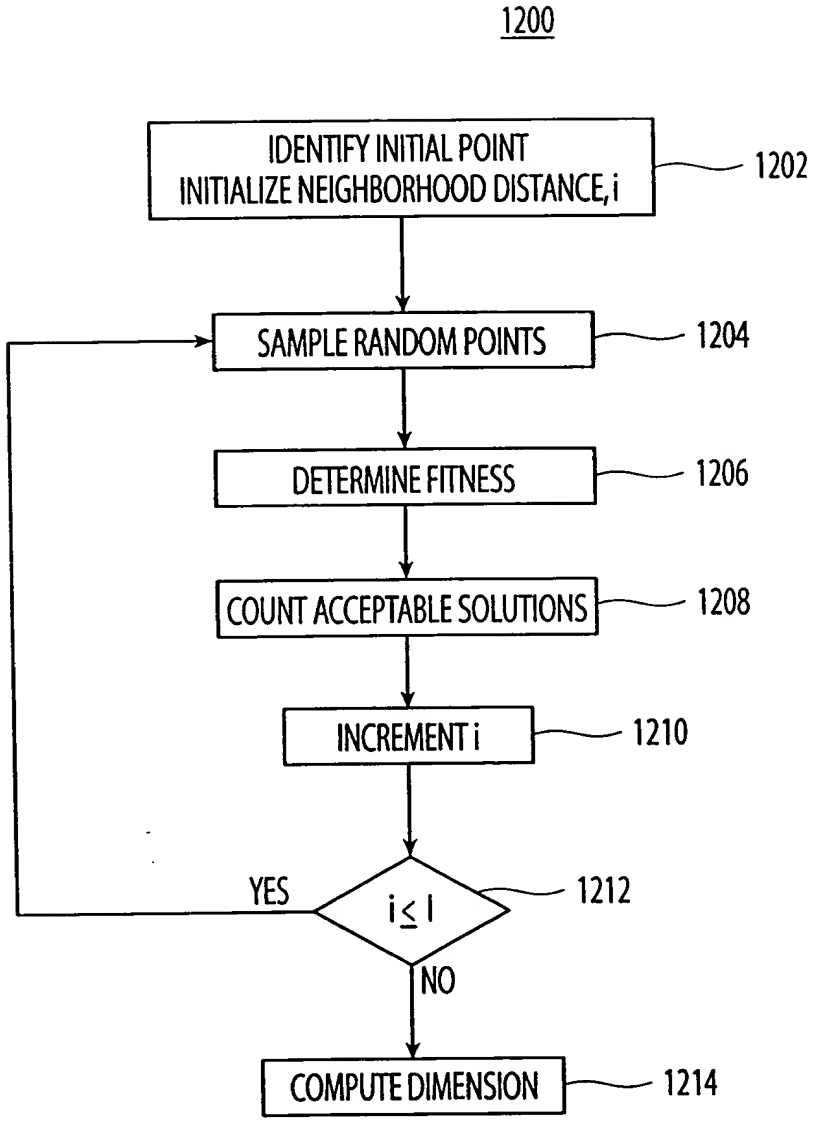

1200
IDENTIFY INITIAL POINT
INITIALIZE NEIGHBORHOOD DISTANCE, i
1202
SAMPLE RANDOM POINTS
1204
DETERMINE FITNESS
1206
COUNT ACCEPTABLE SOLUTIONS
1208
INCREMENT i
1210
YES
i ≤ I
1212
NO
COMPUTE DIMENSION
1214

Fig. 12a

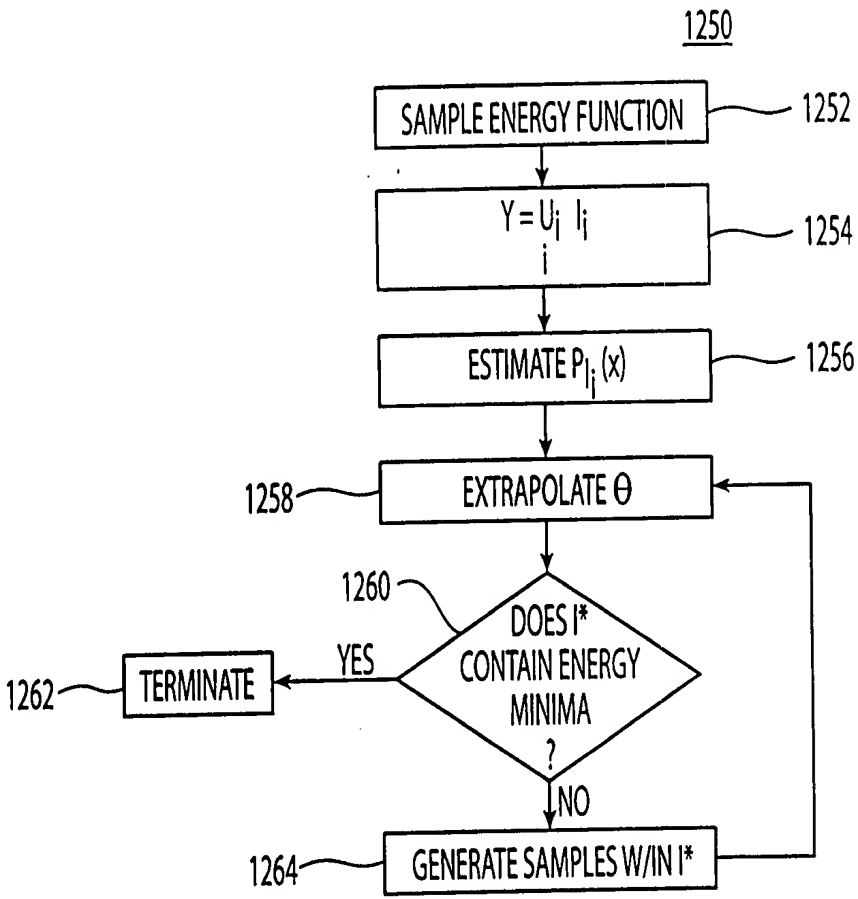


Fig. 12b

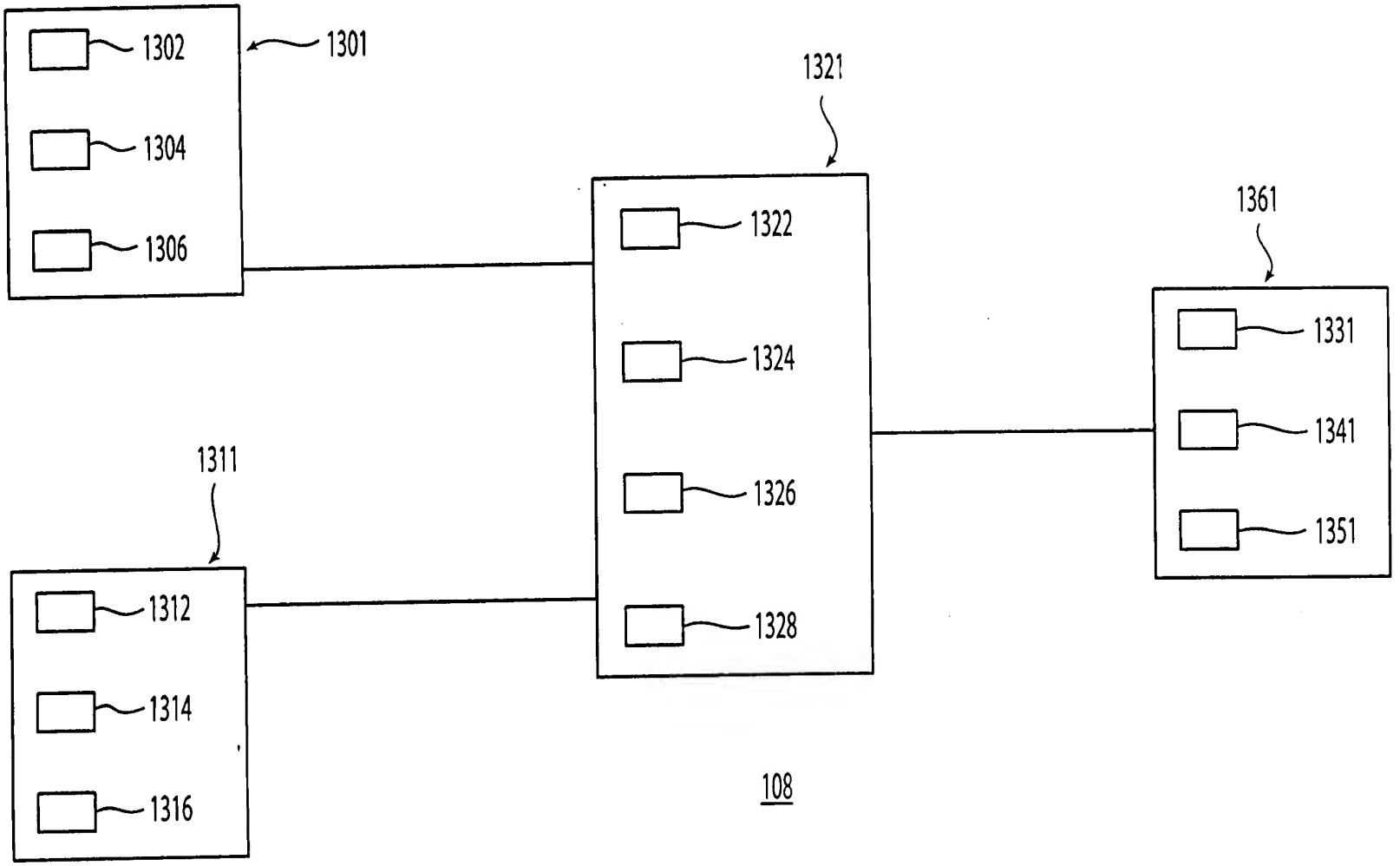

1302
1301
1304
1306
1321
1322
1324
1326
1328
1361
1331
1341
1351
1311
1312
1314
1316
108

Fig. 13a

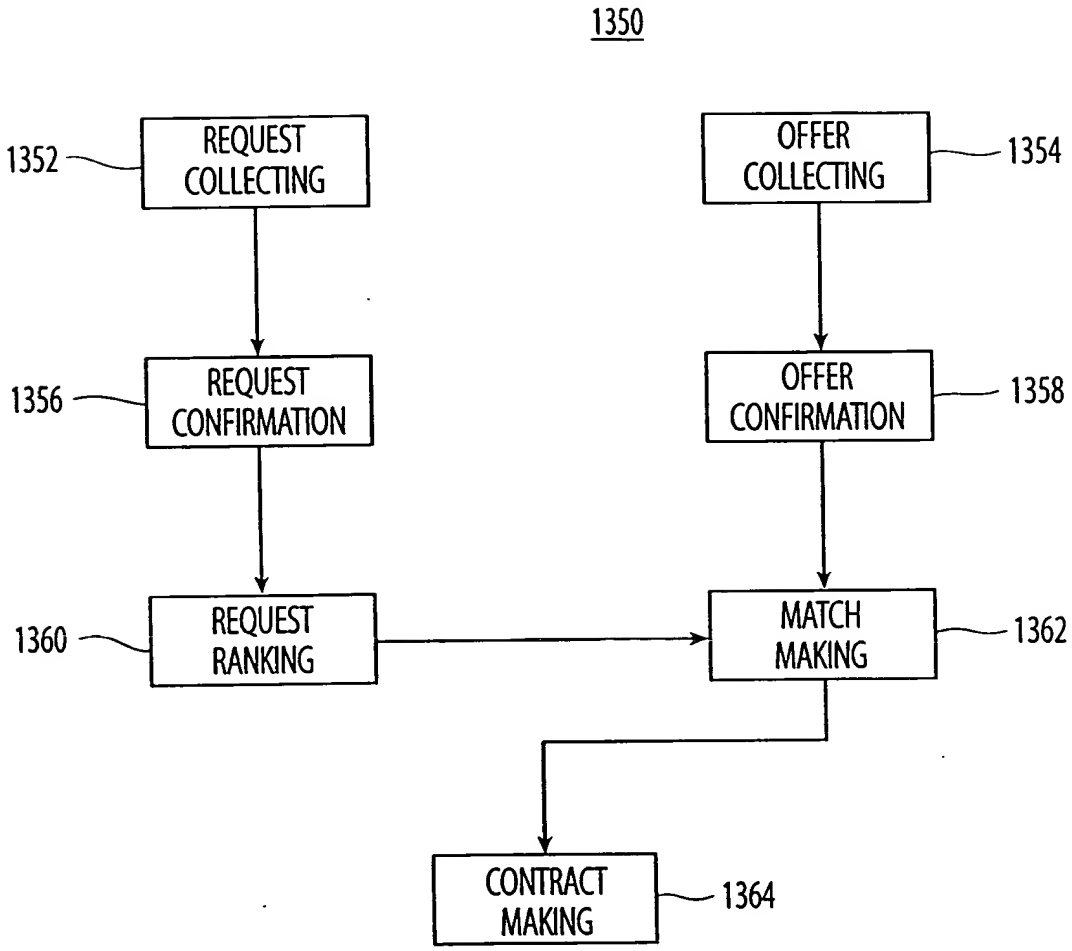

1350
REQUEST COLLECTING
1352
OFFER COLLECTING
1354
REQUEST CONFIRMATION
1356
OFFER CONFIRMATION
1358
REQUEST RANKING
1360
MATCH MAKING
1362
CONTRACT MAKING
1364

Fig. 13b

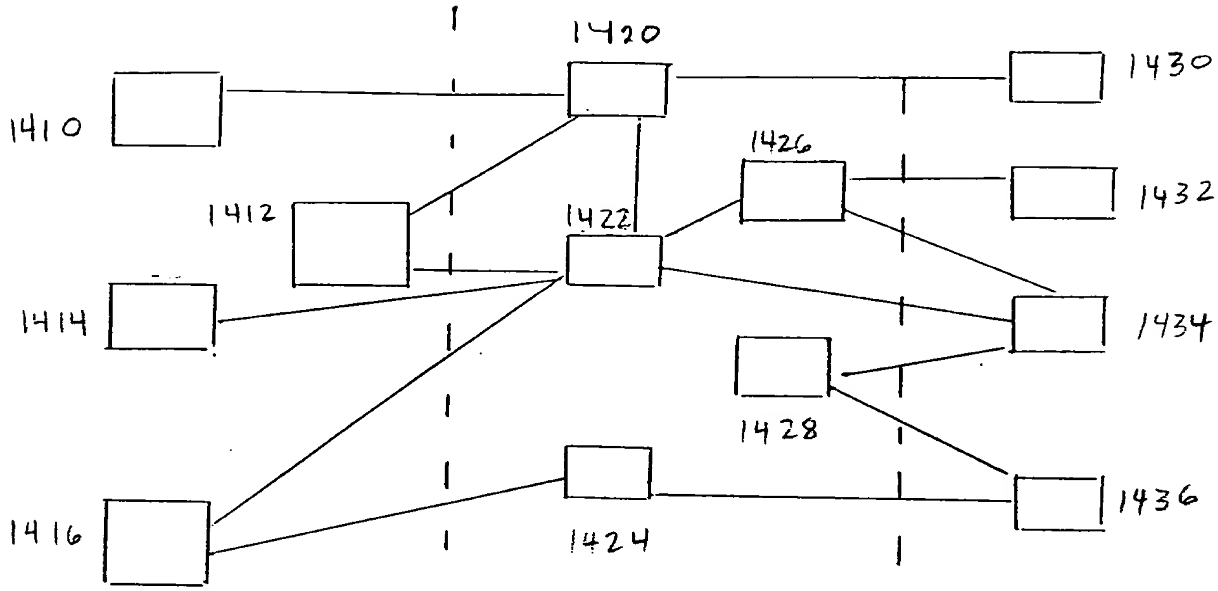


FIG. 14

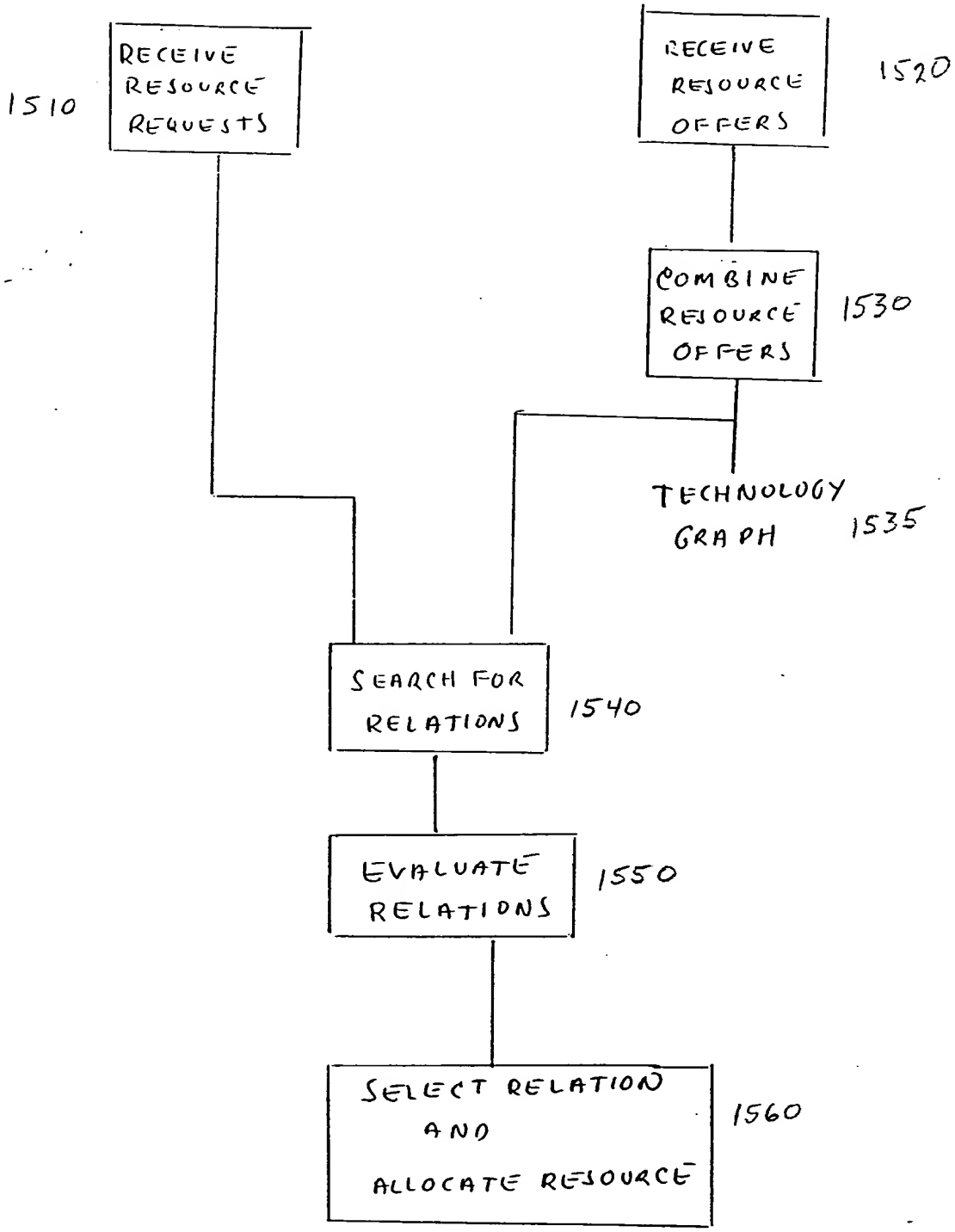

RECEIVE RESOURCE REQUESTS
1510
RECEIVE RESOURCE OFFERS
1520
COMBINE RESOURCE OFFERS
1530
TECHNOLOGY GRAPH
1535
SEARCH FOR RELATIONS
1540
EVALUATE RELATIONS
1550
SELECT RELATION AND ALLOCATE RESOURCE
1560

FIG. 15

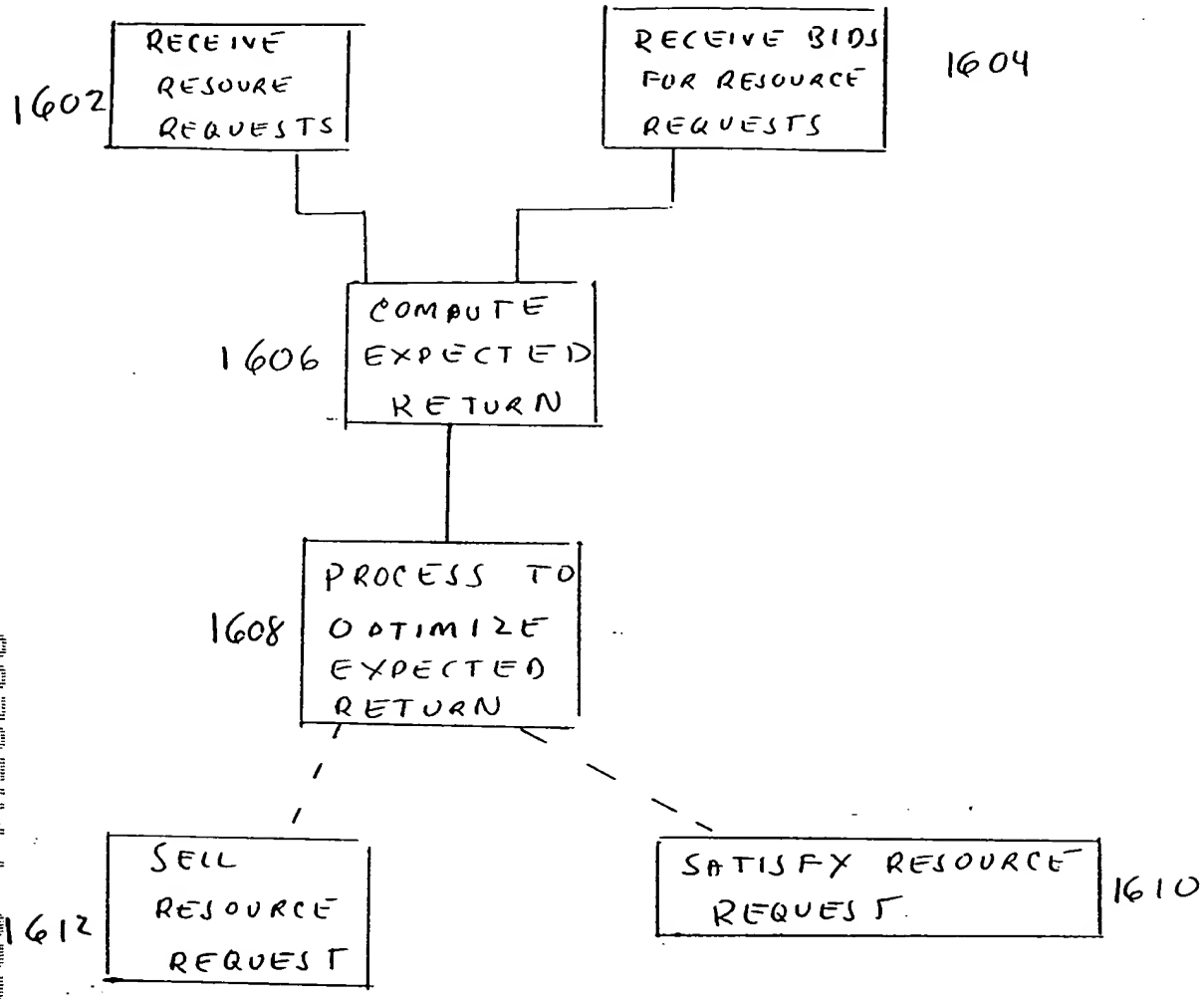
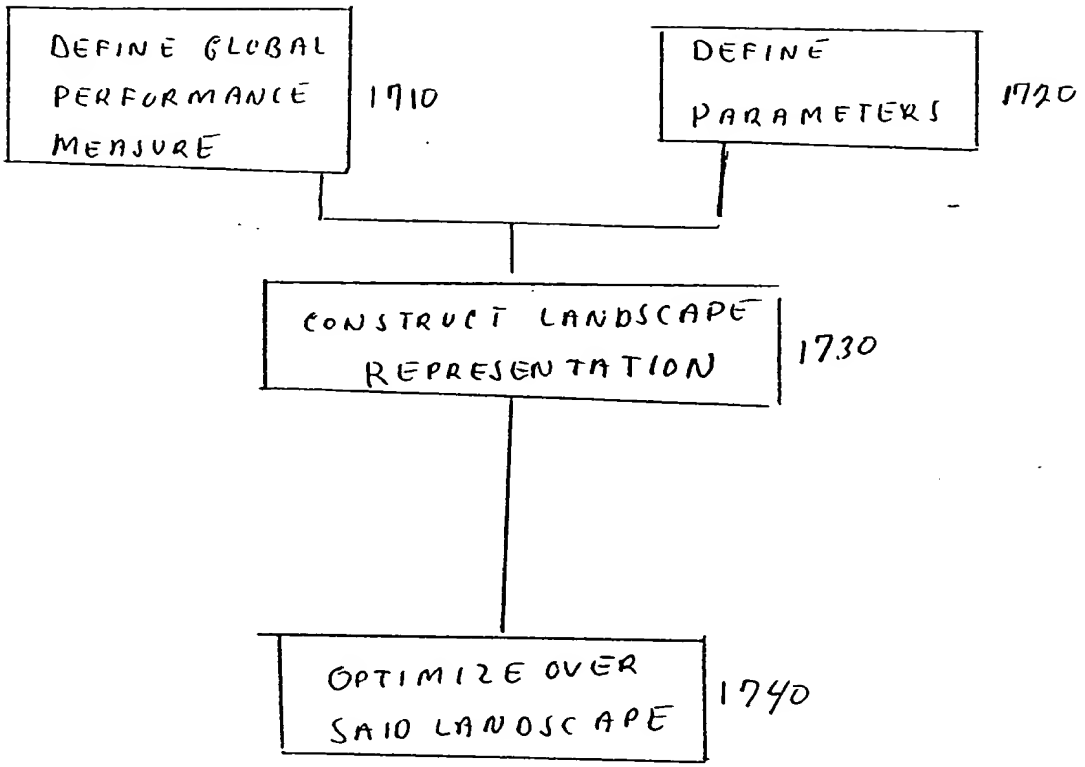

RECEIVE RESOURCE REQUESTS
1602
RECEIVE BIDS FOR RESOURCE REQUESTS
1604
COMPUTE EXPECTED RETURN
1606
PROCESS TO OPTIMIZE EXPECTED RETURN
1608
SELL RESOURCE REQUEST
1612
SATISFY RESOURCE REQUEST
1610

FIG. 16


DEFINE GLOBAL PERFORMANCE MEASURE
1710
DEFINE PARAMETERS
1720
CONSTRUCT LANDSCAPE REPRESENTATION
1730
OPTIMIZE OVER SAID LANDSCAPE
1740

1700

FIG. 17

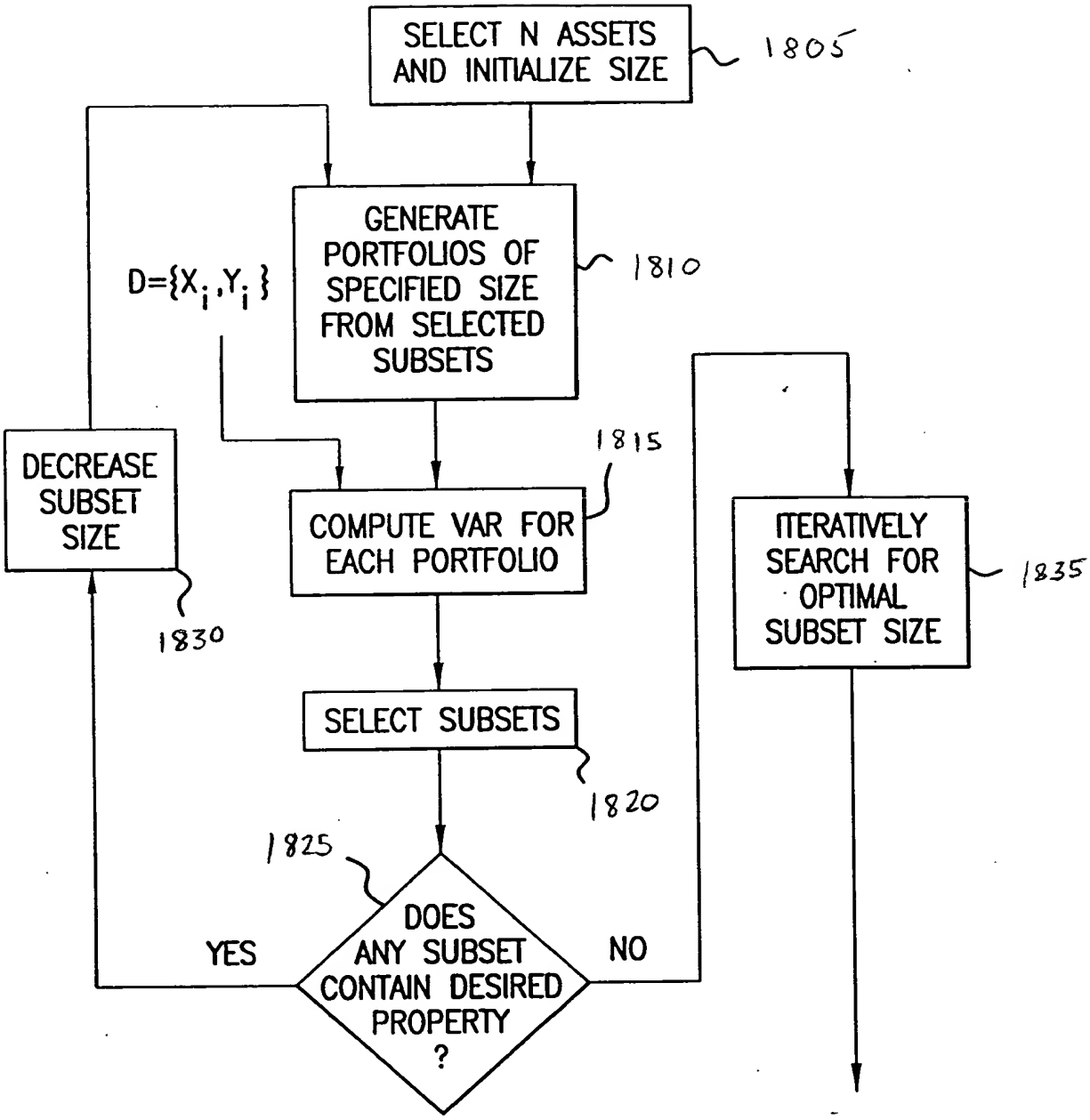

SELECT N ASSETS AND INITIALIZE SIZE
1805
GENERATE PORTFOLIOS OF SPECIFIED SIZE FROM SELECTED SUBSETS
1810
D={X_i, Y_i}
COMPUTE VAR FOR EACH PORTFOLIO
1815
DECREASE SUBSET SIZE
1830
SELECT SUBSETS
1820
1825
DOES ANY SUBSET CONTAIN DESIRED PROPERTY ?
YES
NO
ITERATIVELY SEARCH FOR OPTIMAL SUBSET SIZE
1835

FIG. 18

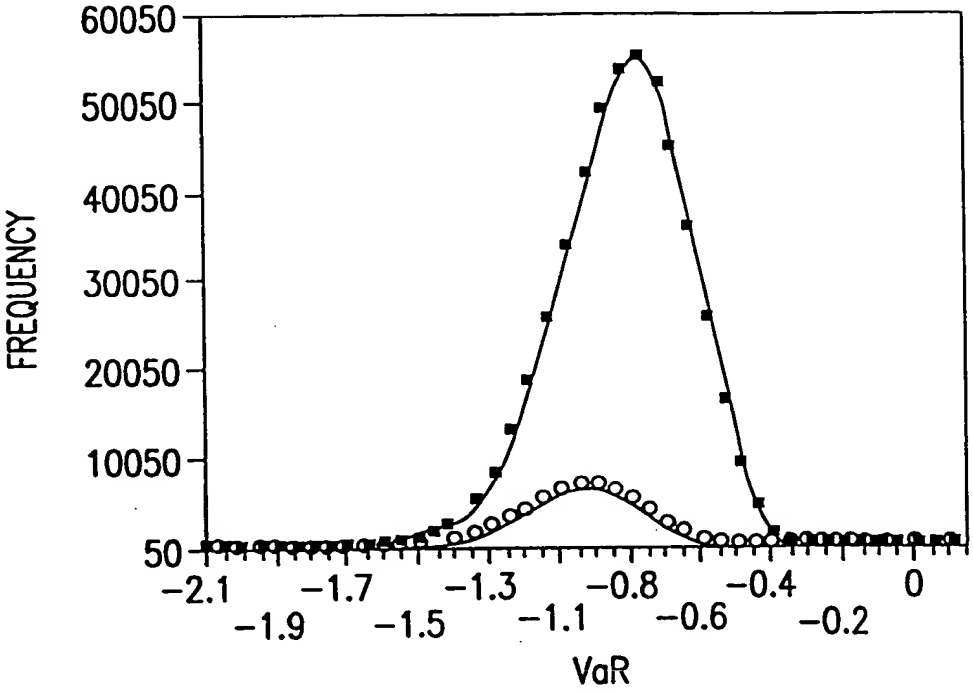

60050
50050
40050
30050
20050
10050
50
FREQUENCY
-2.1
-1.9
-1.7
-1.5
-1.3
-1.1
-0.8
-0.6
-0.4
-0.2
0
VaR

FIG. 19

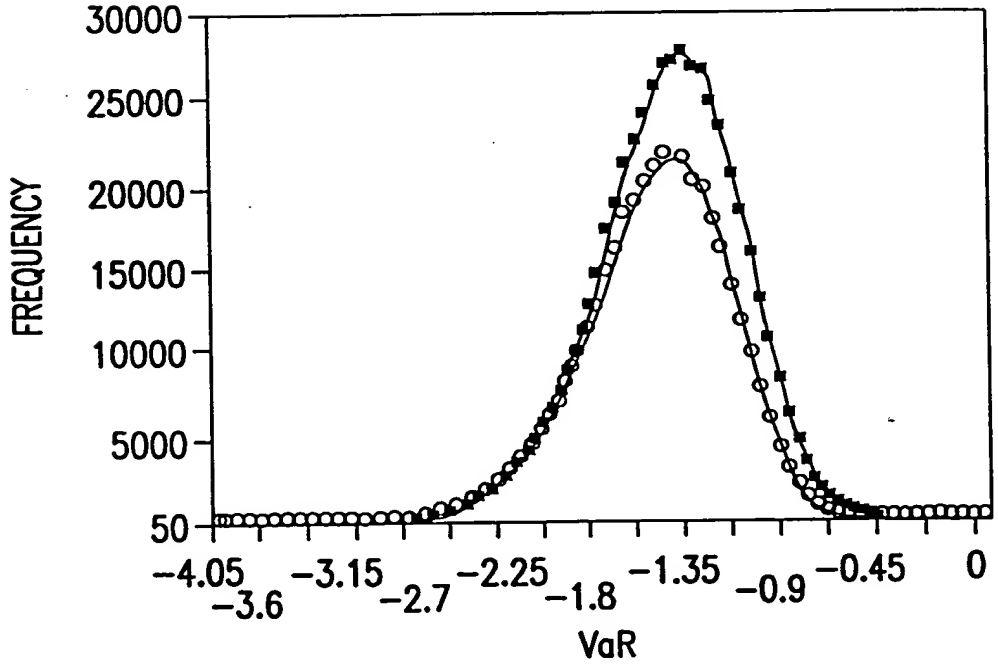

30000
25000
20000
15000
10000
5000
50
FREQUENCY
-4.05
-3.6
-3.15
-2.7
-2.25
-1.8
-1.35
-0.9
-0.45
0
VaR

FIG. 20

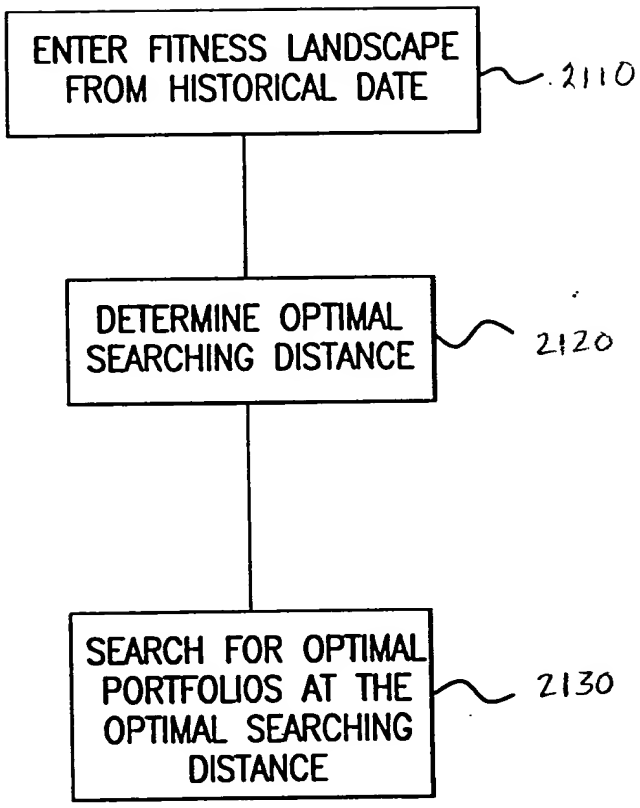

ENTER FITNESS LANDSCAPE FROM HISTORICAL DATE
2110
DETERMINE OPTIMAL SEARCHING DISTANCE
2120
SEARCH FOR OPTIMAL PORTFOLIOS AT THE OPTIMAL SEARCHING DISTANCE
2130

FIG. 21

{1, 1, {2, −1.}}
{1, 2, {1,−1.}}
{1, 3 {5, −0.629195}}
{1, 4, {5, −0.749052}}
{3, 5, {3, −0.629195}, {4, −0.749052}, {24, −0.350841}}
{1, 6, {8, −0.3866}}
{2, 7, {8, −0.434322}, {9, −0.514114}}
{3, 8, {6, −0.3866}, {7, −0.434322}, {9, −0.332176}}
{2, 9, {7, −0.514114}, {8, −0.332176}}
{2, 10, {11, −1.}, {17, −0.333359}}
{2, 11, {10, −1.}, {15, −0.311709}}
{1, 12, {14, −0.889441}}
{1, 13, {14, −0.411215}}
{2, 14, {12, −0.889441}, {13, −0.4112215}}
{3, 15, {11, −0.311709}, {17, −0.593436},{18, −0.602979}}
{2, 16, {17, −0.503126}, {18, −0.52658}}
{3, 17, {10, −0.333359}, {15, −0.593436}, {16, −0.503126}}
{2, 18, {15, −0.60979}, {16, −0.52658}}
{1, 19, {20, −1.}}
{1, 20, {19, −1.}}
{1, 21, {23, −0.770342}}
{1, 22, {23, −0.696416}}
{2, 23, {21, −0.770342}, {22, −0.696416}}
{1, 24, {5, −0.350841}}
{2, 25, {26, −0.491271}, {27, −0.459285}}
{2, 26, {25, −0.491271}, {27, −0.49478}}
{2, 27, {25, −0.459285}, {26, −0.49478}}
{1, 28, {29, −1.}}
{1, 29, {28, −1.}}
{1, 30, {32, −0.794733}}
{1, 31, {32, −0.53383}}
{2, 32, {30, −0.794733}, {31, −0.53383}}

FIG. 22

{3., 1}, {2., −1.}, {47., −0.31}, {87., −0.3}}
{2., 2., {1., −1.}, {46., −0.31}}
{2., 3., {5., −0.63}, {80., −0.34}}
{1., 4., {5., −0.75}}
{3., 5, {3., −.063}, {4., −0.75}, {24., −0.35}}
{1., 6., {8., −0.39}}
{2., 7., {8., −0.43}, {9., −0.51}}
{4., 8., {6., −0.39}, {7., −0.43}, {9., −0.33}, {44., −0.35}}
{5., 9., {7., −0.51}, {8., −0.33}, {54., −0.3}, {75., −0.3}, {98., −42}}
{3., 10, {11., −1.}, {17., −0.33}, {39., −0.36}}
{2., 11., {10., −1}, {15., −0.31}}
{3., 12., {14., −0.89}, {62., −0.35}, {90., −0.3}}
{2., 13., {14., −0.41}, {61., −0.31}}
{4., 14., {12., −0.89}, {13., −0.41}, {82., −0.32}, {89., −0.35}}
{5., 15., {11., −0.31}, {17., −0.59}, {18., −0.6}, {39., −0.31}, {80., −0.31}
{3., 16., {17., −0.5}, {18., −0.53}, {82., −0.32}
{4., 17., {10., −0.33}, {15., −0.59}, {16., −0.5}, {36., −0.38}}
{2., 18., {15., −0.6}, {16., −0.53}}
{2., 19., {20., −1.}, {42., −0.3}}
{1., 20., {19., −1.}}
{3., 21., {23., −0.77}, {45., −0.32}, {94., −0.3}}
{2., 22., {23., −0.7}, {97., −0.32}}
{2., 23., {21., −0.77}, {22., −0.7}}
{1., 24., {5., −0.35}}
{2., 25., {26., −0.49}, {27., −0.46}}
{2., 26., {25., −0.49}, {27., −0.49}}
{2., 27., {25., −0.46}, {26., −0.49}}
{3., 28., {29., −1.}, {48., −0.31}, {76., −0.31}}
{2., 29., {28., −1.}, {77., −0.3}}
{1., 30., {32., −0.79}}
{2., 31., {32., −0.53}, {89., −0.31}}
{3., 32., {30., −0.79}, {31., −0.53}, {46., −0.31}}
{2., 33., {35., −0.46}, {39., −0.31}}
{1., 34., {36., −0.39}}
{4., 36., {17., −0.38}, {34., −0.39}, {35., −0.51}, {54., −0.33}}
{1., 37., {38., −1.}}
{1., 38., {37., −1.}}
{4., 39., {10., −0.36}, {15., −0.31}, {33., −0.31}, {41., −0.49}}
{1., 40., {41., −0.79}}
{2., 41., {39., −0.49}, {40., −0.79}}
{1., 42., {19., −0.3}}
{3., 43., {44., −0.43}, {45., −0.4}, {69., −0.31}}
{3., 44., {8., −0.35}, {43., −0.43}, {45., −0.53}}
{3., 45., {21., −0.32}, {43., −0.4}, {44., −0.53}}
{3., 46., {2., −0.31}, {32., −0.31}, {47., −1.}}
{2., 47., {1., −0.31}, {46., −1.}}
{2., 48., {28., −0.31}, {50., −0.74}}
{1., 49., {50., −0.72}}
{2., 50., {48., −0.74}, {49., −0.74}}

FIG. 23A

{2., 51., {53., −0.62., {54., −0.57}}
{0, 52.}
{2., 53., {51., −0.62}, {94., −.38}}
{4., 54., {9., −0.3}, {36., 0.33}, {51., 0.57}, {72., 0.31}}
{1., 55., {56., −1.}}
{1., 56., {55., −1.}}
{2., 57., {59., −0.61}, {91., −0.47}}
{1., 58., {59., −0.79}}
{2., 59., {57., −0.61}, {58., −0.79}}
{1., 60., {63., −0.45}}
{3., 61., {13., −0.31}, {62., −0.3}, {63., −0.36}}
{3., 62., {12., −0.35}, {61., −0.3}, {63., −0.61}}
{3., 63., {60., −0.45}, {61., −0.36}, {62., −0.61}}
{1., 64., {65., −1.}}
{1., 65., {64., −1.}}
{1., 66., {68., −0.39}}
{1., 67., {68., −0.97}}
{2., 68., {66., −0.39}, {67., −0.97}}
{1., 69., {43., −0.31}}
{1., 70., {72., −0.45}}
{1., 71., {72., −0.63}}
{3., 72., {54., −0.31}, {70., −0.45}, {71., −0.63}}
{1., 73., {74., −1.}}
{1., 74., {73., −1.}}
{2., 75., {9., −0.3}, {77., −0.74}}
{2., 76., {28., −0.31}, {77., −0.71}}
{3., 77., {29., −0.3}, {75., −0.74}, {76., −0.71}}
{3., 78., {80., −0.65}, {81., −0.6}, {99., −0.31}}
{2., 79., {80., −0.5} {81., −0.44}}
{4., 80., {3., −0.34}, {15., −0.31}, {78., −0.65}, {79., −0.5}}
{2., 81., {78., −0.6}, {79., −0.44}}
{3., 82., {14., −0.32}, {16., −0.32}, {83., −1.}}
{1., 83., {82., −1.}}
{1., 84., {86., −0.59}}
{1., 85., {86., −0.85}}
{2., 86., {84., −0.59}, {85., −0.85}}
{1., 87., {1., −0.3}}
{0, 88.}
{3., 89., {14., −0.35}, {31., −0.31}, {90., −0.92}}
{2., 90., {12., −0.3}, {89., −0.92}}
{1., 91., {57., −0.47}}
{0, 92.}
{0, 93.}
{2., 94., {21., −0.3}, {53., −0.38}}
{0, 95.}
{0, 96.}
{1., 97., {22., −0.32}}
{1., 98., {9., −0.42}}
{1., 99., {78., −0.31}}
{0, $1.0X10^2$}

FIG. 23b

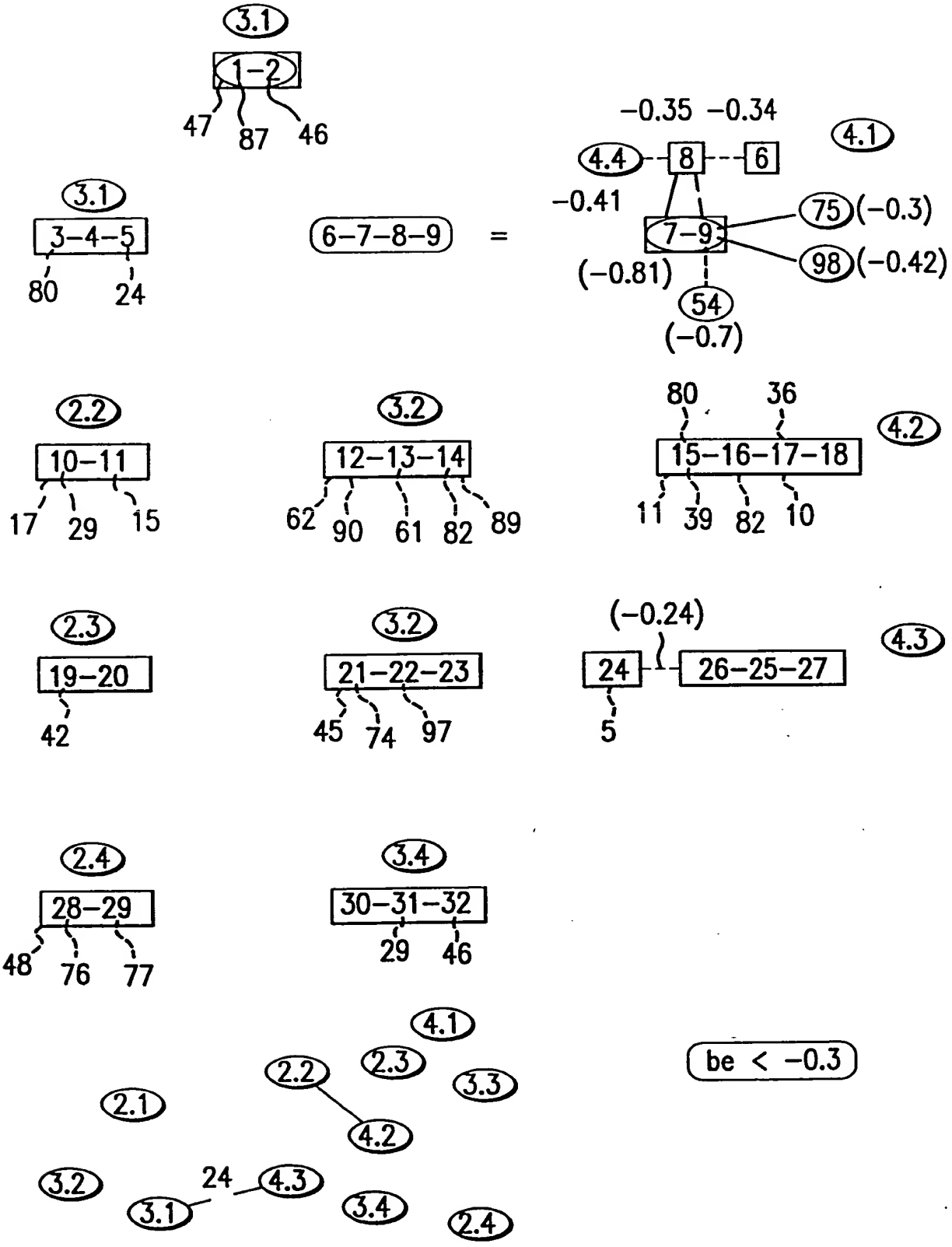
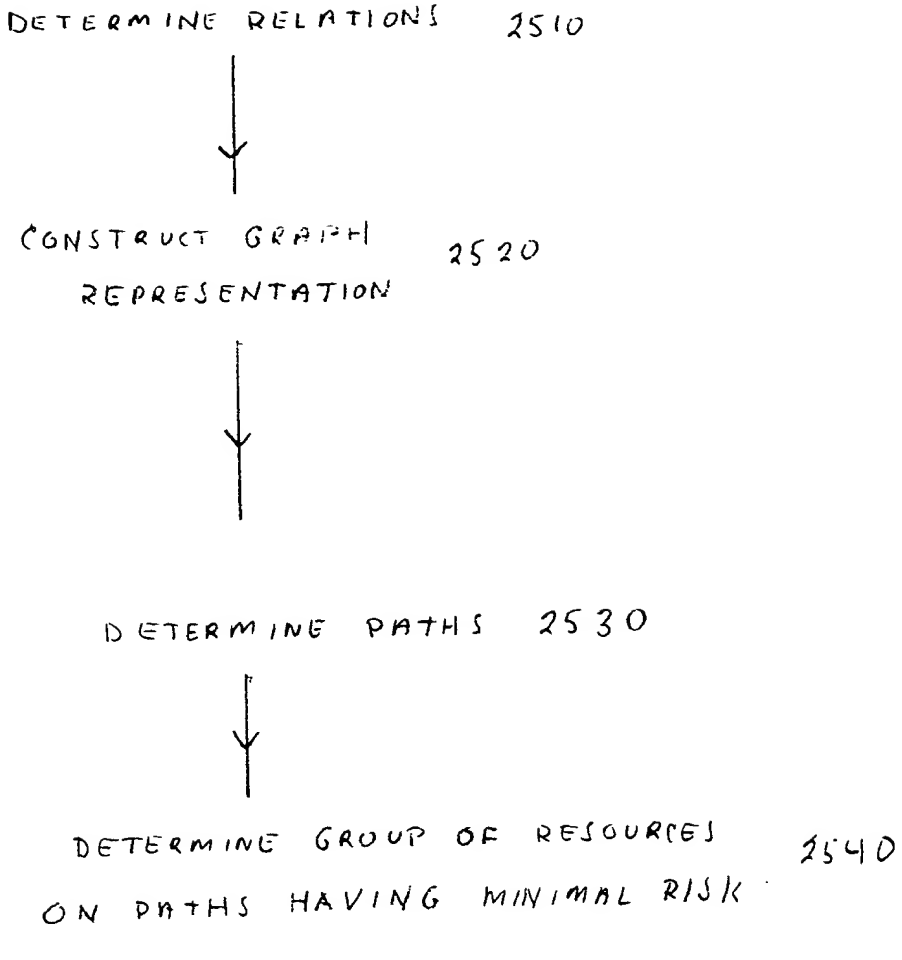

3.1
1–2
47 87 46
3.1
3–4–5
80 24
6–7–8–9 =
−0.35 −0.34
4.1
4.4
8
6
−0.41
75 (−0.3)
7–9
98 (−0.42)
(−0.81)
54
(−0.7)
2.2
10–11
17 29 15
3.2
12–13–14
62 90 61 82 89
80 36
4.2
15–16–17–18
11 39 82 10
2.3
19–20
42
3.2
21–22–23
45 74 97
(−0.24)
4.3
24
26–25–27
5
2.4
28–29
48 76 77
3.4
30–31–32
29 46
4.1
2.3
2.2
3.3
2.1
4.2
3.2
24
4.3
3.1
3.4
2.4
be < −0.3

FIG. 24


DETERMINE RELATIONS 2510
CONSTRUCT GRAPH REPRESENTATION 2520
DETERMINE PATHS 2530
DETERMINE GROUP OF RESOURCES ON PATHS HAVING MINIMAL RISK 2540

2500

FIG. 25

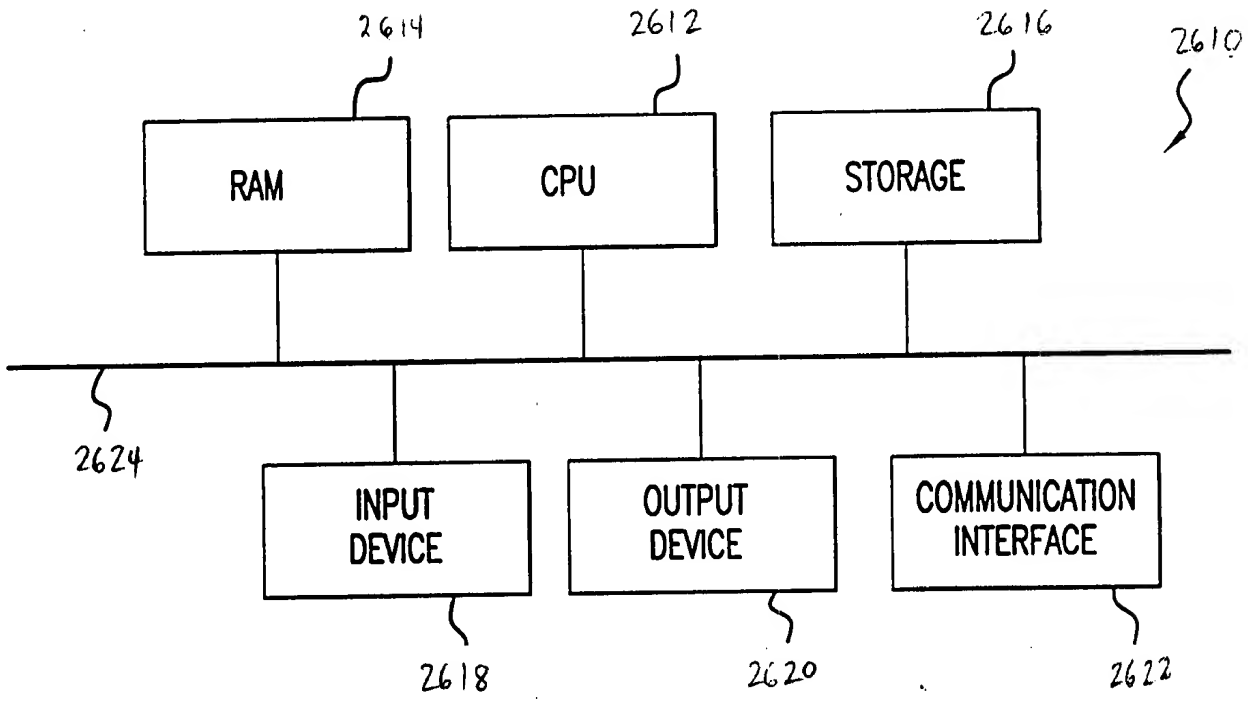

2614
2612
2616
2610
RAM
CPU
STORAGE
2624
INPUT DEVICE
OUTPUT DEVICE
COMMUNICATION INTERFACE
2618
2620
2622

FIG. 26